/NJO

Product Specifications

29.6" WXGA Color TFT-LCD Module
Model Name: T296XW01

( ) Preliminary Specifications
(*) Final Specifications

T296XW01   Ver0.5   1/24

Contents

T296XW01 Ver0.5

Record of Revision

Version	Date	No	Description	Remark
0.0	Aug. 5,'03		First Draft (Preliminary)	
0.1	Nov. 14'03	1	Outline Dimension depth change to 41.6mm	Modify
		3-1	Electrical Characteristics	Update
		3-2	Interface Connections	Update
		3-3	Signal Timing Specification	Update
		3-5	Color Input Data Reference	Update
		4	Optical Specification	Update
		5	Mechanical Characteristics	Modify
		5	User Hole Drawing	Delete
0.2	Nov. 20'03	3-2	Timing Table	Update
			Inverter Voltage	Update
			Inverter Current	Update
0.3	Dec. 22'03	1	Surface Treatment Change to 2H, LR	Update
		3-1	Inrush Current Unit Change to "A"	Update
		3-3	DTCLK Min and Max Change	Update
		4	VA Change to CR >10	Update
		5	A.A. Vertical Dimension Change to 385.92mm	Update
			ME 2D Drawing	Update

Version	Date	No	Old Description	New Description	Remark
0.4	Mar. 23'03	1	Surface Treatment : LR	Surface Treatment : AR	Update
		2	Icc : typ 850, max 950	Icc : typ 550, max 650	Update
		2	Pc : typ 10.2, max 11.9	Pc : typ 6.8, max 8.19	Update
		1	Surface Treatment : 2H,LR	Surface Treatment : Hard Coating 2H,AR	Update
		2		nput Voltage of Signal : Min : -0.3, Max : 3.6	Add
		2		BLU Brightness Control Voltage : Min : -0.3, Max : 7	Add
		3-1	Icc : Typ : 850mA, Max : 950mA	Icc : Typ : 550mA, Max : 650mA	Update
		3-1	Pc : Typ : 10.2W, Max : 11.9W	Pc : Typ : 10.2W, Max : 11.9W	Update
		3-1	Irush Duration	Irush Duration : 200us	Add

		3-2		Brightness Control 0V : 60% of max Brightness	Add
		3-3	1/Th : Typ 48.5Khz	1/Th : Typ 47.5Khz	Update
		3-6		Power Sequence Table	Add
		6	Altitude : 40000feet	Altitude : 50000feet, 12Kpa	Update
			Luminance Variation : 1.6Max	Luminance Variation : 70% Min	Update
		9		Packing Information	Add
0.5	Mar. 31'04.	4	CR : Min 600	CR : Min 500, Typ : 800	Update
			LBK : typ 0.7, Max 1.2	LBK : Max 1.3	Update
			Rx:0.651,Ry:0.327,Gx:0.295,Gy:0.584,Bx:0.140,By:0.065,Wx:0.295,Wy:0.291	Rx:0.643,Ry:0.329,Gx:0.292,Gy:0.587,Bx:0.138,By:0.074,Wx:0.284,Wy:0.295	Update
	Apr. 09 '04	6	Shock test: 120G, 2ms	Shock test: 50G, 11ms	Update

1. General Description

This specification applies to the 29.53 inch Color TFT-LCD Module T296XW01. This LCD module has a TFT active matrix type liquid crystal panel 1280x768 pixels, and diagonal size of 29.53 inch. This module supports 1280x768 XGA-WIDE mode (Non-interlace).
Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 8-bit gray scale signal for each dot.
The T296XW01 has been designed to apply the 8-bit 1 channel LVDS interface method. It is intended to support displays where high brightness, wide viewing angle, high color saturation, and high color depth are very important.

* General Information

| Items	Specification	Unit	Note
Active Screen Size	29.53 inches		
Display Area	643.20 (H) x 385.92(V)	mm	
Outline Dimension	683.6(H) x 431.8(V) x 41.6(D)	mm	With inverter
Driver Element	a-Si TFT active matrix		
Display Colors	16.7M	Colors	
Number of Pixels	1280 x 768	Pixel	
Pixel Arrangement	RGB vertical stripe		
Display Mode	0.5025(H) x 0.5025(W)		
Surface Treatment	Hard-Coating 2H, AR		

2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	13.5	[Volt]	Note 1
Input Voltage of Signal	Vin	-0.3	3.6	[Volt]	Note 1
BLU Input Voltage	VDDB	-0.3	27.0	[Volt]	Note 1
BLU Brightness Control Voltage	BLON	-0.3	7.0	[Volt]	Note 1
Operating Temperature	TOP	0	+50	[^{o}C]	Note 2
Operating Humidity	HOP	10	90	[%RH]	Note 2
Storage Temperature	TST	-20	+60	[^{o}C]	Note 2
Storage Humidity	HST	10	90	[%RH]	Note 2

Note 1 : Duration = 50msec

Note 2 : Maximum Wet-Bulb should be 39℃ and No condensation.
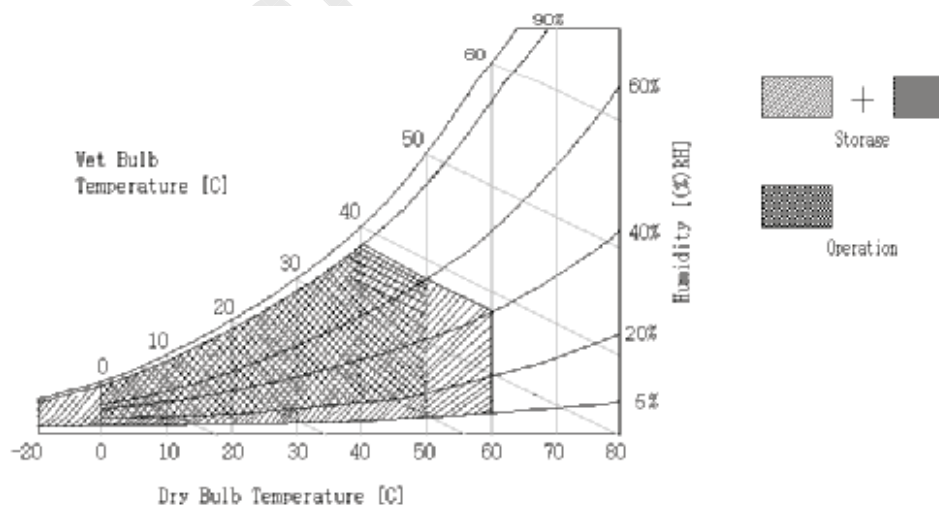
3. Electrical Specification

The T296XW01 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input power for the BLU, is to power inverter..

3-1 Electrical Characteristics

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
LCD:						
Power Supply Input Voltage	Vcc	11.4	12.0	12.6	Vdc	
Power Supply Input Current	Icc	-	550	650	mA	1
Power Consumption	Pc	-	6.6	8.19	Watt	1
Inrush Current	I$_{RUSH}$	-	-	4.7	Apeak	2
Backlight Power Consumption			96	115	Watt	
Life Time		50,000			Hours	3

Note :

1. Vcc=12.0V, $f_v = 60$Hz, fCLK=65Mhz , 25℃,

2. Duration = 200 μs

3. The performance of the Lamp in LCM, for example life time or brightness, is extremely influenced by the characteristics of the DC-AC Inverter. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter. When you design or order the inverter, please make sure unwanted lighting caused by the mismatch of the lamp and the inverter (no lighting, flicker, etc) never occurs. When you confirm it, the LCD Assembly should be operated in the same condition as installed in your instrument.

4. Do not attach a conducting tape to lamp connecting wire. If the lamp wire attach to conducting tape, TFT-LCD Module have a low luminance and the inverter has abnormal action because leakage current occurs between lamp wire and conducting tape.

5. The relative humidity must not exceed 80% non-condensing at temperatures of 40℃ or less. At temperatures greater than 40℃, the wet bulb temperature must not exceed 39℃. When operate at low temperatures, the brightness of CCFL will drop and the life time of CCFL will be reduced.

3-2 Interface Connections
- LCD connector (CN1): DF19KR-20P-1H (Hirose) or equivalent
- Mating Connector   : DF19KR-20S-1H (Hirose) or equivalent
- LVDS Transmitter: SN75LVDS83(Texas Instruments) or equivalent

| Pin No.	Symbol	Function	Polarity	Note
1	L_Order	LVDS Order Selection		H=3.3V, L=GND
2	GND	Ground		
3	VCC	Power Supply +12V		
4	VCC	Power Supply +12V		
5	VCC	Power Supply +12V		
6	VCC	Power Supply +12V		
7	GND	Ground		
8	GND	Ground		
9	RxIN3+	Positive LVDS differential data input		
10	RxIN3-	Negative LVDS differential data input		
11	RCLK+	Positive LVDS differential clock input		
12	RCLK-	Negative LVDS differential clock input		
13	RxIN2+	Positive LVDS differential data input (DE, H-Sync, V-Sync)		
14	RxIN2-	Negative LVDS differential data input (DE, H-Sync, V-Sync)		
15	RxIN1+	Positive LVDS differential data input		
16	RxIN1-	Negative LVDS differential data input		
17	RxIN0+	Positive LVDS differential data input		
18	RxIN0-	Negative LVDS differential data input		
19	GND	Ground		
20	GND	Ground		

Note:
1. All GND (ground) pins should be connected together and should also be connected to the LCD's metal frame. All Vcc (power input) pins should be connected together.
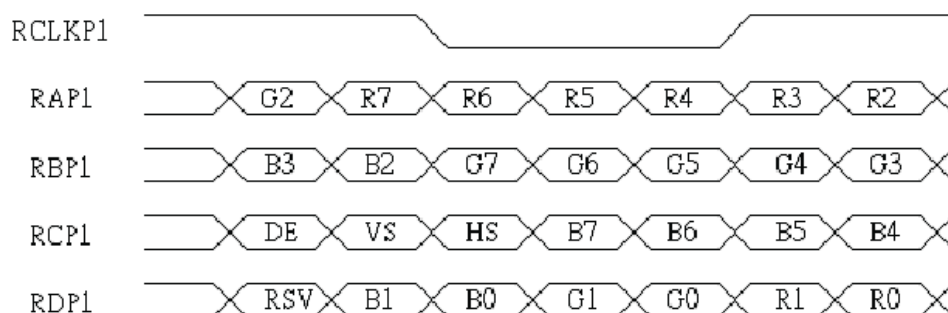
LVDS Order Selection
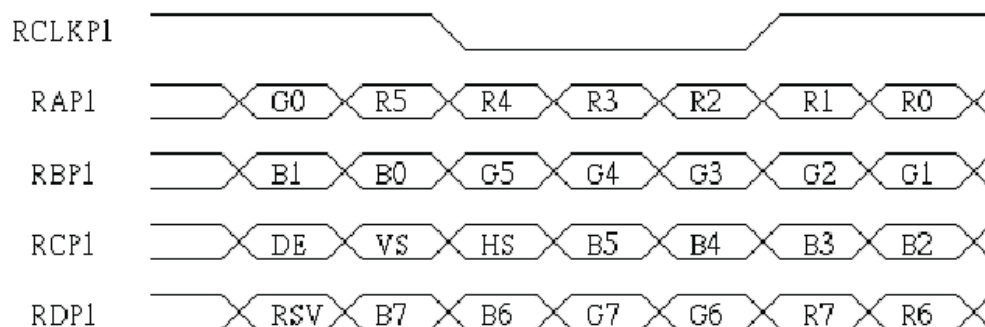
BACKLIGHT CONNECTOR PIN CONFIGURATION -

1‧Electrical specification

（Ta=25±5℃）

No	ITEM		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT	Note
1	Input voltage		VDDB		21.6	24.0	26..4	V	
2	Input current		IDDB	VDDB=24V Max. Brightness	3.6	4.0	4.4	A	
3	Input inrush current		IRUSH	VDDB=24V	-	-	5.5	A	0.3ms
	Output frequency		F0	VDDB=24V,MAX	59	60.5	62	kHz	
4	PWM frequency		FBI	VDDB=24V	240	270	300	Hz	
5	ON/OFF Control voltage	ON	BLON	VDDB=24V	2.0	—	5.0	V	or OPEN
		OFF	BLON	VDDB=24V	0	—	0.8	V	
6	Dimming Control voltage	MAX	VDIM	VDDB=24V	—	1.0	—	V	
		MIN	VDIM	VDDB=24V	—	0	—	V	

2‧Input specification

CN1: S10B-PH-SM3-TB(JST)

Pin №	Signal name	Feature
1	VDD	+24V
2	VDD	+24V
3	VDD	+24V
4	VDD	+24V
5	VDD	+24V
6	GND	GND
7	GND	GND
8	GND	GND
9	GND	GND
10	GND	GND

CN2: S12B-PH-SM3-TB(JST)

Pin №	Signal name	Feature	
1	VDD	+24V	
2	VDD	+24V	
3	VDD	+24V	
4	VDD	+24V	
5	VDD	+24V	
6	GND	GND	
7	GND	GND	
8	GND	GND	
9	GND	GND	
10	GND	GND	
11	VDIM	Bright control	※1
12	BLON	ON/OFF Signal	※2

※1: Connection of brightness control terminal
　　(1)Bright control by the volume
　　　　VDIM-GND short-circuit　:　Min. brightness
　　　　VDIM-GND 10kΩ　:　Max. brightness
　　　　OPEN　:　Max. brightness
　　(2)Bright control by the voltage
　　　　0V　:　Min. brightness : 60% of max brightness
　　　　1V　:　Max. brightness
　　　　OPEN　:　Max. brightness
※2: BLON Logic
　　　　H　:　Back Light ON
　　　　L　:　Back Light OFF
　　　　OPEN　:　Back Light ON

3-3 Signal Timing Specifications

This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications for it's proper operation.

* Timing Table

DE only Mode

Item		Symbol	Min.	Typ.	Max.	Unit
DCLK	Period	Tc	14.3	15.4	17.2	ns
	Freq.	fc	55	65	75	MHz
Hsync	Freq.	1/Th	46.5	47.5	48.5	KHz
Vsync	Freq.	1/Yv	---	60	66	Hz
Vertical	TTL		776	806	850	Th
	Active	Tvd	768	768	768	Th
Horizontal	TTL		1340	1344	2000	DCLK
	Active	Thd	1280	1280	1280	DCLK

*1) DCLK signal input must be valid while power supply is applied.
*2) Display position is specific by the rise of ENAB signal only.
Horizontal display position is specified by the falling edge of 1st DCLK right after the rise of ENAB, is displayed on the left edge of the screen.
Vertical display position is specified by the rise of ENAB after a "Low" level period equivalent to eight times of horizontal period. The 1st data corresponding to one horizontal line after the rise the of ENAB is displayed at the top line of screen.
3.) If a period of ENAB "High" is less than 1280 DCLK or less than 768 lines, the rest of the screen displays black.
4.) The display position does not fit to the screen if a period of ENAB "High" and the effective data period do not synchronize with each other.

3-4 Signal Timing Waveforms
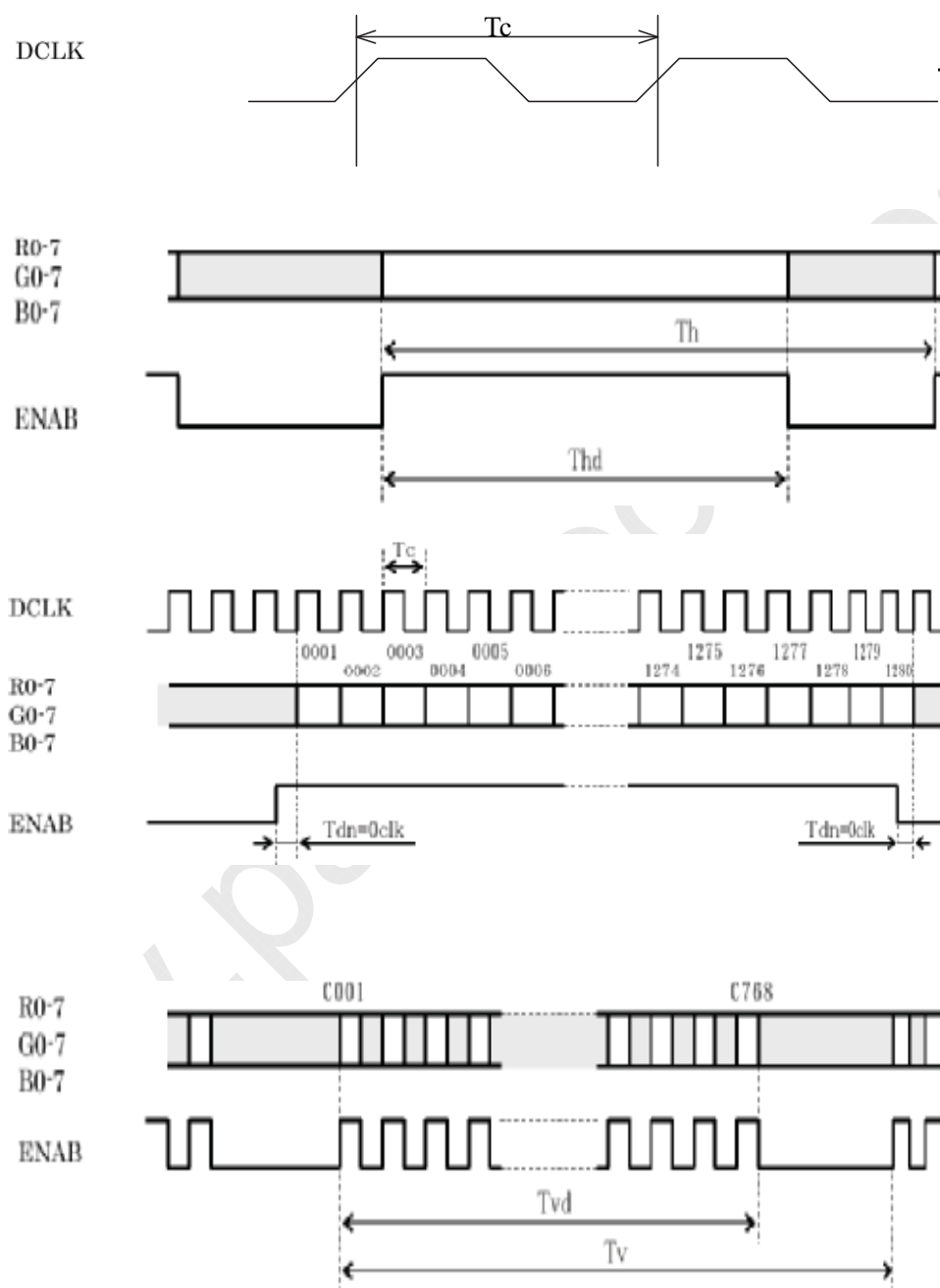
3-5 Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 8 bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

COLOR　DATA　REFERENCE

Color		Input Color Data																								
		RED (MSB...LSB)								GREEN (MSB...LSB)								BLUE (MSB...LSB)							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(001)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(000)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

3-6 Power Sequence
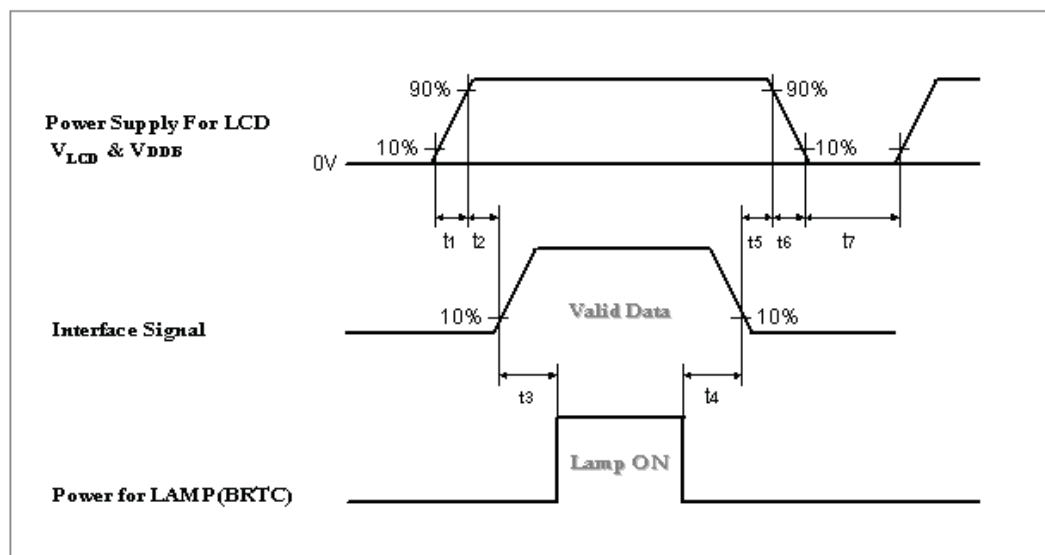
Parameter	Values			Units
	Min.	Typ.	Max.	
t1	470	-	1000	us
t2	5	-	-	ms
t3	200	-	-	ms
t4	200	-	-	ms
t5	5	-	-	ms
t6	-	-	30	ms
t7	1	-	-	s

4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25℃. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

Fig.1 1 presents additional information concerning the measurement equipment and method.
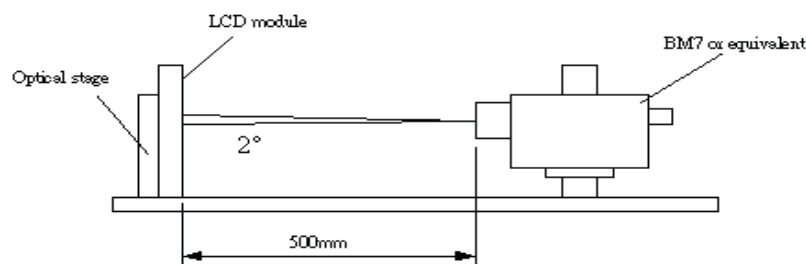
Parameter		Symbol	Values			Units	Notes
			Min.	Typ.	Max.		
Contrast Ratio		CR	500	800			1
Surface Luminance, white		LWH	500	600		cd/㎡	2
Luminance Variation		δ_{WHITE} 5 p	70		.	%	3
Response Time		Tγ		16		ms	4 (Gray to Gray)
	Rise Time	Tr		15	18	ms	
	Decay Time	Tf		10	13	ms	
Color Coordinates							
	RED	R_X		0.643			
		R_Y		0.329			
	GREEN	G_X		0.292			
		G_Y		0.587			
	BLUE	B_X	Typ.-0.03	0.138	Typ.+0.03		
		B_Y		0.074			
	WHITE	W_X		0.284			
		W_Y		0.295			
Viewing Angle							
	x axis, right($\varphi=0°$)	θ_r		85		Degree	5
	x axis, left($\varphi=180°$)	θ_l		85			
	y axis, up($\varphi=90°$)	θ_u		85			
	y axis, down ($\varphi=0°$)	θ_d		85			

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Note:

1. Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance of } L_{on1}}{\text{Surface Luminance of } L_{off1}}$$

2. Surface luminance is luminance value at point 1 across the LCD surface 50cm from the surface with all pixels displaying white. From more information see FIG 2. When VDDB = 24V, IDDB = 4A. $L_{WH}=Lon1$

Where Lon1 is the luminance with all pixels displaying white at center 1 location.

3. The variation in surface luminance, δ WHITE is defined (center of Screen) as:

$$\delta_{WHITE(5P)} = \text{Minimum}(L_{on1}, L_{on2}, \ldots L_{on5}) / \text{Maximum}(L_{on1}, L_{on2}, \ldots, L_{on5})$$

4. Response time is the time required for the display to transition from to black (Rise Time, Tr_R) and from black to white (Decay Time, Tr_D). For additional information see FIG3. Some gray to gray response time could be more than 16ms (75ms Max) because of material limitation.

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG4.
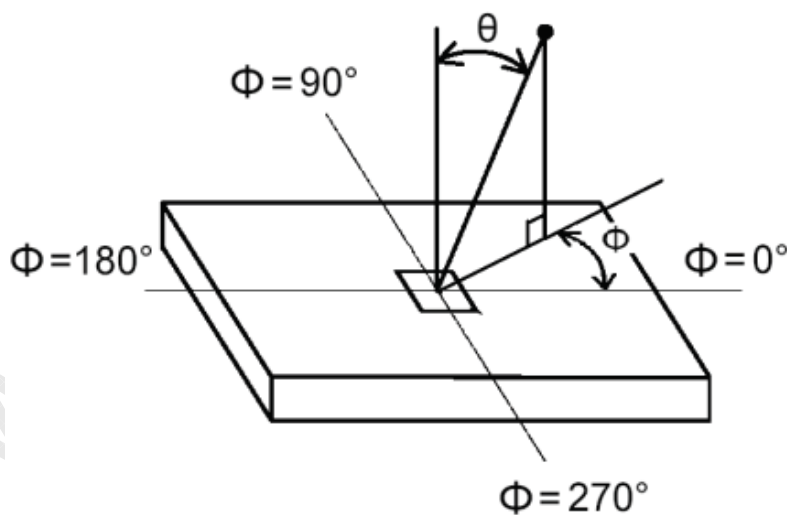
FIG. 2 Luminance

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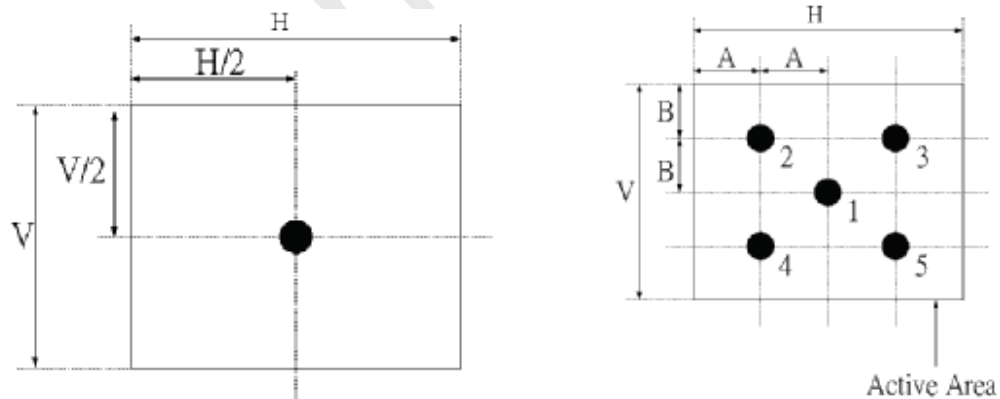
FIG.3 Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

FIG.4 Viewing angle

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January, 2003 All Rights Reserved.　　　　T296XW01 Ver0.5　　　　　　　　17/26
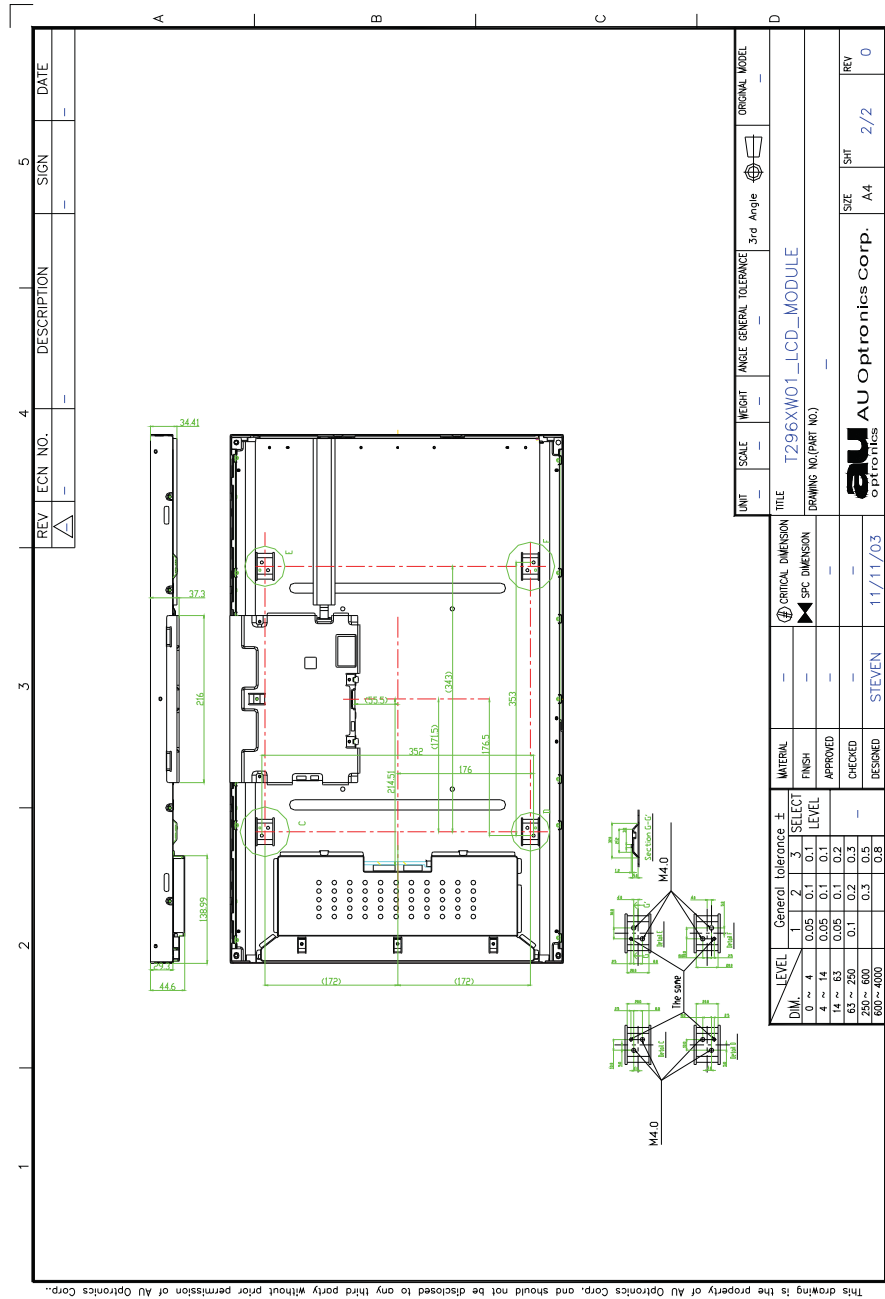No Reproduction and Redistribution Allowed
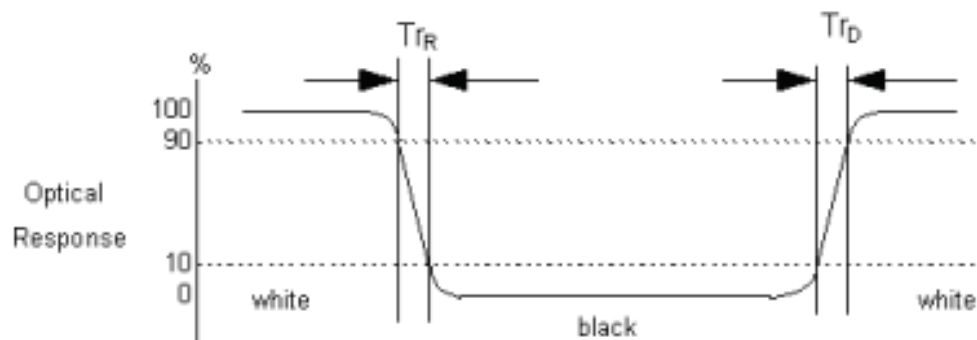
5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model T296XW01. In addition the figures in the next page are detailed mechanical drawing of the LCD.

Outline Dimension	Horizontal	683.6mm
	Vertical	431.8mm
	Depth	41.6mm(w/I inverter & Shielding) 37.3mm(w/o inverter)
Bezel Area	Horizontal	648.8mm
	Vertical	391.5mm
Active Display Area	Horizontal	643.2mm
	Vertical	385.92mm
Weight	5000g (Typ.)	
Surface Treatment	Hard Coating (2H)	

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Front View

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Rear View

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6. Reliability

Environment test condition

No	Test Item	Condition
1	High temperature storage test	Ta=60℃ 240h
2	Low temperature storage test	Ta=-20℃ 240h
3	High temperature operation test	Ta=50℃ 50%RH 240h
4	Low temperature operation test	Ta=0℃ 240h
5	Vibration test (non-operating)	Wave form: random Vibration level : 1.0G RMS Bandwidth : 10-500Hz Duration: X, Y, Z 20min 　　　　　One time each direction
6	Shock test (non-operating)	Shock level: 50G Waveform: half since wave, 11ms Direction: ±X, ±Y, ±Z 　　　　　One time each direction
7	Vibration test (with carton)	Random Vibration:10~200Hz,1.5G,30minutes in each X,Y,Z direction
8	Drop test (with carton)	Height: 53.3cm 1 corner, 3 edges, 6 surfaces (ASTMD4169-I)
9	Altitude Storage/shipment	50,000 feet (12Kpa)

{ Result Evaluation Criteria }

There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.

7. International Standard

7-1. Safety

(1) UL1950 Third Edition, Underwriters Laboratories, Inc. Jan. 28, 1995

Standard for Safety of Information Technology Equipment Including electrical Business Equipment.

(2) CAN/CSA C22.2 No. 950-95 Third Edition, Canadian Standards Association, Jan. 28, 1995

Standard for Safety of Information Technology Equipment Including Electrical Business Equipment.

(3) EN60950 : 1992+A2: 1993+A2: 1993+C3: 1995+A4: 1997+A11: 1997

IEC 950: 1991+A1: 1992+A2: 1993+C3: 1995+A4:1996

European Committee for Electrotechnical Standardization (CENELEC)

EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

7-2. EMC

a) ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz. "American National standards Institute(ANSI), 1992

b) C.I.S.P.R "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." International Special committee on Radio Interference.

c) EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." European Committee for Electrotechnical Standardization. (CENELEC), 1998
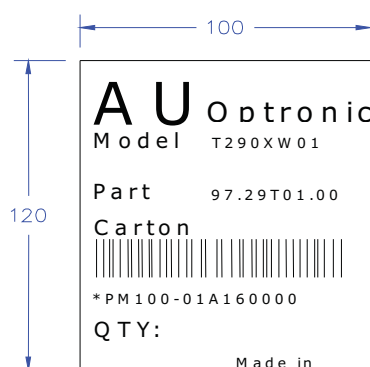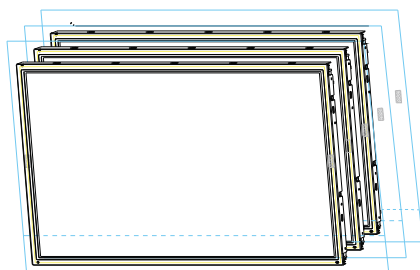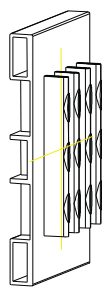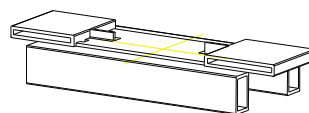
8. Packing

Label sample　　83mm * 23mm

Carton Label

AU Optronic
Model T290XW01
Part 97.29T01.00
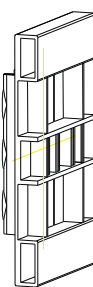Carton
*PM100-01A160000
QTY:
Made in

T296XW01　Ver0.5

Carton Size   767(L)mm*330(W)mm*480(H)mm

3pcs Modules

Cushion top

Cushion set
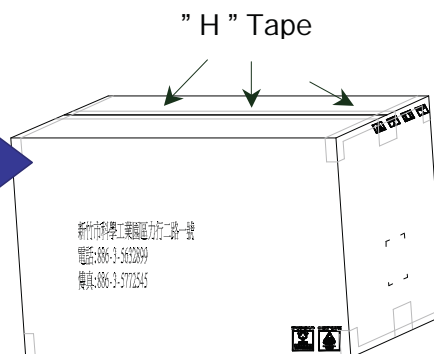
Cushion down

Cushion top

"H" Tape

新竹市科學工業園區力行二路一號
電話:886-3-5632099
傳真:886-3-5772545

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傳真:886-3-5772545

3pcs / 1 carton

1pcs Module

T296XW01 Ver0.5
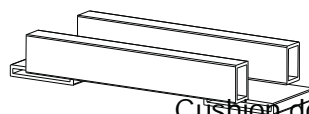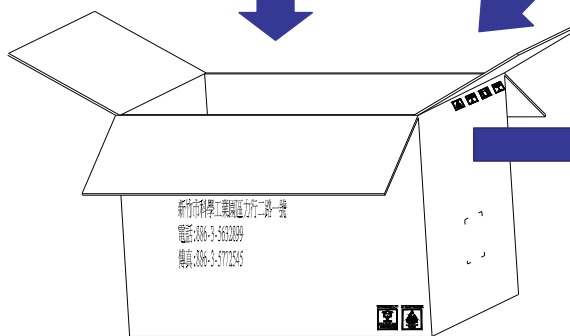
9. PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

9-1 MOUNTING PRECAUTIONS

(1) You must mount a module using holes arranged in four corners or four sides.

(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(4) You should adopt radiation structure to satisfy the temperature specification.

(5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.

(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)

(7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front/ rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(9) Do not open the case because inside circuits do not have sufficient strength.

9-2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage:

V=±200mV(Over and under shoot voltage)

(2) Response time depends on the temperature. (In lower temperature, it becomes longer..)

(3) Brightness depends on the temperature. (In lower temperature, it becomes lower.) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interface.

9-3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

9-4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

9-5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

(1)　Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.

(2)　The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

9-6 HANDLING PRECAUTIONS FOR PROTECTION FILM

(1)　The protection film is attached to the bezel with a small masking tape. When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.

(2)　When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of flue still on the Bezel after the protection film is peeled off.

(3)　You can remove the glue easily. When the glue remains on the Bezel or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.